National Laboratory for Applied Network Research (NLANR)
Distributed Applications Support Team (DAST)

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NLANR/DAST

- **http://dast.nlanr.net**

- **http://beacon.ncsa.uiuc.edu**

- **http://beacon.dast.nlanr.net**

Outline of DAST efforts

- **NLANR/DAST is 100% NSF funded**

- **Outreach**
  - Technical information & campus alliances (NextINet.org)
  - Advanced Applications Database being moved to NextINet

- **Training / Expertise Exchange**
  - Workshops, tutorials & meetings

- **Tools**
  - Custom & general (The Advisor, Iperf, Multicast Beacon)

- **Applications Consultation**
  - One to one & group

The NLANR Network Performance Advisor

- Single application which integrates the measuring, analyzing, and displaying of network performance statistics.

- Provides platform to allow easy integration of any number of network diagnostic tools, combined with the ability to uniformly query the results of those tools.

- Network debugging utility aimed for network engineers

- Includes - ping, ifconfig, iperf, AMP, Surveyor, and the Web100 suite of tools.

The Advisor distinguishes itself by being able to display and analyze an extremely broad set of network statistics, due to its ability to integrate any network diagnostic

The NLANR Network Performance Advisor

- Uses existing diagnostic tools:
  - ping, traceroute, Iperf, and Web100
  - integrates them into a common framework

- Attempts to emulate a junior-level network engineer:
  - Allows users to troubleshoot their own networking problems
  - Advises users on course of action, including "do nothing—your network performance is as good as possible"

- Additional tools and analyses are simple to add

- Implementation details:
  - Written in Java, uses XML-RPC for portability and extensibility

  - **http://dast.nlanr.net/projects/advisor**

Multicast Beacon

- **Multicast Beacon is active measurement software that monitors the performance of a multicast session**
  - Came out of the needs of the Access Grid development/user community
    - Multicast Beacon now a standard component for AG nodes
  - Provides measurement data for AG multicast traffic
    - Can be used as a general-purpose measurement tool as well
  - Reports
    - Loss - Percentage of packet loss from one client to another
    - RTT - Round Trip Time (in milliseconds) from one client to another
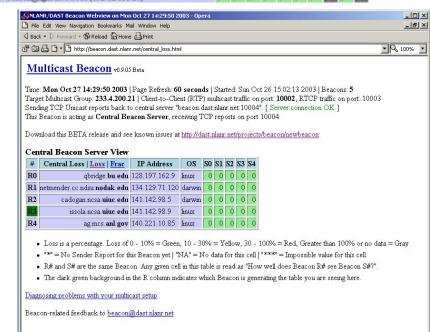   - Jitter – Variation in delay – Measure of short term congestion

Beacon Server

- **RTP-based Perl script**
- **RFC-3550**
- **v0.9.55 RC1**
- **Still Beta / Friendly User**

- **Server**
  - A central server collects the performance data from the Beacon Clients in the group
  - Can start or stop at any time
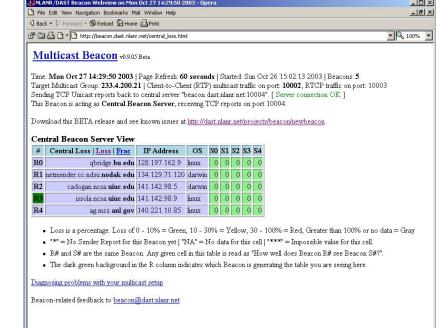 - Only one server is needed for multiple Beacons

- **RTP-based Perl script**
- **Client**
  - Sends 48 byte RTP packets to other clients at 80 ms intervals via UDP
    - Measures the performance of the transmission
  - Sends ~348 byte RTCP packets to other clients at interval dictated by RTP (~ 4-6 seconds)
  - Reports to the Beacon Server every sixty seconds via TCP unicast

Beacon Display

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NATIONAL LABORATORY FOR APPLIED NETWORK RESEARCH

NLANR/DAST Beacon Webview on Wed Jun 9 9:00:59 2004 - Opera

File Edit View Navigation Bookmarks Mail Window Help

Back ▾ Forward ▾ Reload Home Print

NLANR/DAST Beacon We…

http://beacon.ncsa.uiuc.edu/   100%

Multicast Beacon v0.9.55 RC1

Time: Wed Jun 9 9:00:59 2004 CST | Page Refresh: **60 seconds** | Started: Wed Jun 9 8:46:56 2004 | Beacons: **12**
Target Multicast Group: **233.4.200.22**, Client-to-Client (RTP) multicast traffic on port: **10006**, RTCP traffic on port: 10007
TCP unicast reports going back to the Central Server on port 10008

Central Loss | Local Loss | Fract Loss | Central RTT | Local RTT | Central Jitter (ms) | Local Jitter (ms) | Beacon Info | 600-second History | Previous History

#	Central Loss (%)	IP Address	SSRC	RRs	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9		S10	S11
R0	accessgrid2.**netera.ca**	129.128.125.62	0x5acd138f	264	0	0	0	0	0	0	0	0	0	0	R0	0	NA
R1	andrew.**triumf.ca**	142.90.106.59	0x13b49f90	312	0	0	0	0	0	0	0	0	0	0	R1	0	NA
R2	tnt02.**triumf.ca**	142.90.100.120	0x61516005	288	0	0	0	0	0	0	0	0	0	0	R2	0	NA
R3	video.**triumf.ca**	142.90.114.158	0x70e715ec	288	0	0	0	0	0	0	0	0	0	0	R3	0	NA
R4	mokash.ns.**uvic.ca**	142.104.22.13	0x4079ce45	220	0	NA	0	NA	0	0	0	0	0	0	R4	0	NA
R5	cadogan.ncsa.**uiuc.edu**	141.142.98.5	0x7df05318	288	0	0	0	0	0	0	0	0	0	0	R5	0	NA
R6	iperfjunkie.ncsa.**uiuc.edu**	Localhost	0x1b433012	264	0	0	0	0	0	0	0	0	0	0	R6	0	NA
R7	issola.ncsa.**uiuc.edu**	141.142.2.168	0x7e19ac57	288	0	0	0	0	0	0	0	0	0	0	R7	0	NA
R8	jhereg.ncsa.**uiuc.edu**	141.142.98.157	0x5ca181fa	288	0	0	0	0	0	0	0	0	0	0	R8	0	NA
R9	yendi.ncsa.**uiuc.edu**	141.142.2.109	0x6138c15b	288	0	0	0	0	0	0	0	0	0	0	R9	0	NA
#	Central Loss (%)	IP Address	SSRC	RRs	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9		S10	S11
R10	gemini.**nersc.gov**	128.55.16.111	0x4dec15f6	48	NA	NA	NA	NA	NA	0	0	0	0	0	R10	0	NA
R11	qbridge	128.197.162.9	0x655b204c	312	0	0	0	0	0	0	0	0	0	0	R11	0	0

Diagnosing problems with your multicast setup

Central Loss is the reported loss between two Beacons in the current multicast group, sent via TCP unicast back to the Central Server (in this case, "beacon.ncsa.uiuc.edu") for the group. This allows for the reporting of Beacons that might not otherwise be able to see each other via UDP multicast.

- Central_loss of 0 - 10 = Green, 10 - 30 = Yellow, 30 - 100 = Red, No data ("NA") = Gray
- R# and S# are the same Beacon. Any given cell in this table is read as "How well does Beacon R# see Beacon S#?".
- The dark green background in the R column shows which Beacon is generating the table you are seeing here.

The "RRs" column is the count of RTP Receiver Reports received from each SR during the previous interval. For any given interval, the count of reports should be approximately the same. If your Beacon's report count is much lower than the others, it means your Beacon has only recently joined the multicast If you know you Beacon has been running for some time, it may be showing router-level multicast problems, which is why the option was included in this release of the Beacon. If your Beacon is joining and leaving and joining and leaving, this it what that would look like.

Please share your comments, questions, bug reports, concerns, and feedback with us via the Beacon listserv. **Please note this list can only be posted to by SUBSCRIBERS, in order to keep it spam-free.** Non-subscriber email is automatically discarded. You can subscribe to the list by sending an email to "majordomo /at/ dast.nlanr.net", with "subscribe beacon /at/ dast.nlanr.net" (with real "at" signs, of course) in the body. This list is publicly archived at http://archive.ncsa.uiuc.edu/lists/beacon.

Another way to contact us is to use the DAST contact webform.

Beacon Display

#	Central Loss (%)	IP Address	SSRC	RRs	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9		S10	S11	S12	S13
R0	accessgrid2.**netera.ca**	129.128.125.62	0x5acd138f	308	0	0	0	1	0	0	0	0	0	0	R0	0	NA	0	0
R1	andrew.**triumf.ca**	142.90.106.59	0x13b49f90	336	0	0	0	0	0	0	0	0	0	0	R1	0	NA	0	0
R2	tnt02.**triumf.ca**	142.90.100.120	0x61516005	308	0	0	0	0	0	0	0	0	0	0	R2	0	NA	0	0
R3	video.**triumf.ca**	142.90.114.158	0x70e715ec	364	0	0	0	0	0	0	0	0	0	0	R3	0	NA	0	0
R4	mokash.ns.**uvic.ca**	142.104.22.13	0x4079ce45	288	0	NA	0	NA	0	0	0	0	0	0	R4	0	NA	0	0
R5	cadogan.ncsa.**uiuc.edu**	141.142.98.5	0x7df05318	308	0	0	0	0	0	0	0	0	0	0	R5	0	NA	0	0
R6	iperfjunkie.ncsa.**uiuc.edu**	Localhost	0x1b433012	308	0	0	0	0	0	0	0	0	0	0	R6	0	NA	0	0
R7	issola.ncsa.**uiuc.edu**	141.142.2.168	0x7e19ac57	364	0	0	0	0	0	0	0	0	0	0	R7	0	NA	0	0
R8	jhereg.ncsa.**uiuc.edu**	141.142.98.157	0x6762f5f0	312	0	0	0	0	0	0	0	0	0	0	R8	0	NA	0	0
R9	yendi.ncsa.**uiuc.edu**	141.142.2.109	0x6138c15b	308	0	0	0	0	0	0	0	0	0	0	R9	0	NA	0	0
#	Central Loss (%)	IP Address	SSRC	RRs	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9		S10	S11	S12	S13
R10	gemini.**nersc.gov**	128.55.16.111	0x4dec15f6	24	NA	NA	NA	NA	NA	0	0	0	NA	0	R10	0	NA	NA	NA
R11	qbridge	128.197.162.9	0x655b204c	346	0	0	0	0	0	0	0	0	0	0	R11	59	0	0	0
R12	roeshamboe	141.142.66.146	0x76664bd5	308	0	0	0	0	0	0	0	0	0	0	R12	0	NA	0	0
R13	venues	141.142.64.5	0x01420aba	336	0	0	0	0	0	0	0	0	0	0	R13	0	NA	0	0

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Beacon Registry

#	Beacon	IP Address	SSRC	User	OS	Uptime	Started	Last Heard	Contact Name	Contact Info
B0	accessgrid2.**netera.ca**	129.128.125.62	0x5acd138f	andrew	linux	1 d 18 h 46 m	Tue Jun 8 13:59:53 2004	Thu Jun 10 8:46:15 2004	Andrew Daviel	advax@triumf.ca 604-222-7376
B1	andrew.**triumf.ca**	142.90.106.59	0x13b49f90	andrew	linux	1 d 13 h 20 m	Tue Jun 8 19:25:50 2004	Thu Jun 10 8:46:03 2004	Andrew Daviel	advax@triumf.ca 604-222-7376
B2	tnt02.**triumf.ca**	142.90.100.120	0x61516005	beacon	linux	1 d 17 h 45 m	Tue Jun 8 15:00:53 2004	Thu Jun 10 8:45:48 2004	Andrew Daviel	advax@triumf.ca 604-222-7376
B3	video.**triumf.ca**	142.90.114.158	0x70e715ec	andrew	linux	1 d 14 h 13 m	Tue Jun 8 18:32:42 2004	Thu Jun 10 8:45:56 2004	Andrew Daviel	advax@triumf.ca 604-222-7376
B4	mokash.ns.**uvic.ca**	142.104.22.13	0x4079ce45	rkozsan	linux	1 d 23 h 19 m	Tue Jun 8 9:27:13 2004	Thu Jun 10 8:46:22 2004	Ron Kozsan	rkozsan@uvic.ca
B5	cadogan.ncsa.**uiuc.edu**	141.142.98.5	0x7df05318	mitch	darwin	2 d 12 h 7 m	Mon Jun 7 20:38:38 2004	Thu Jun 10 8:45:35 2004	Mitch Kutzko	mitch@dast.nlanr.net, 217-333-1199
B6	iperfjunkie.ncsa.**uiuc.edu**	Localhost	0x1b433012	mitch	linux	2 d 12 h 4 m	Mon Jun 7 20:42:19 2004	Thu Jun 10 8:45:58 2004	Mitch Kutzko	mitch@dast.nlanr.net, 217-333-1199
B7	issola.ncsa.**uiuc.edu**	141.142.2.168	0x7e19ac57	mitch	linux	2 d 11 h 46 m	Mon Jun 7 20:59:31 2004	Thu Jun 10 8:46:21 2004	Mitch Kutzko	mitch@dast.nlanr.net, 217-333-1199
B8	jhereg.ncsa.**uiuc.edu**	141.142.98.157	0x6762f5f0	mitch	linux	18 h 55 m 55 s	Wed Jun 9 13:50:28 2004	Thu Jun 10 8:45:24 2004	Mitch Kutzko	mitch@dast.nlanr.net, 217-333-1199
B9	yendi.ncsa.**uiuc.edu**	141.142.2.109	0x6138c15b	mitch	linux	2 d 11 h 33 m	Mon Jun 7 21:13:01 2004	Thu Jun 10 8:45:33 2004	Mitch Kutzko	mitch@dast.nlanr.net, 217-333-1199
B10	lg.up.**univ-mrs.fr**	147.94.113.55	0x407e8f2e	pmouret	linux	1 h 11 m 3 s	Thu Jun 10 7:35:20 2004	Thu Jun 10 8:45:50 2004	Pascal Mouret	Pascal.Mouret@up.univ-mrs.fr, +33 491106402
B11	gemini.**nersc.gov**	128.55.16.111	0x4dec15f6	beacon	freebsd	1 d 15 h 27 m	Tue Jun 8 17:18:53 2004	Thu Jun 10 8:46:03 2004	Eli Dart	dart@nersc.gov
B12	qbridge	128.197.162.9	0x655b204c	mitch	linux	2 d 11 h 40 m	Mon Jun 7 21:05:37 2004	Thu Jun 10 8:46:18 2004	Mitch Kutzko	mitch@dast.nlanr.net, 217-333-1199
B13	roeshamboe	141.142.66.146	0x1ffb19e4	ncsavs	linux	18 h 16 m 30 s	Wed Jun 9 14:29:54 2004	Thu Jun 10 8:46:16 2004	Michael Miller	mimiller@ncsa.uiuc.edu, 217-649-0747

- **Generation of XML (machine readable) output**

- **Round-robin burst testing**
  - to catch packet loss due to input queue buffering problems in IOS

- **Periodic three-minute pauses to test leave/join mechanism**

- **Ability to display only "currently active" sites**
  - Sites running something besides a Beacon

- **Ability to display subset data**

- **Beacon-generated RTP data vs. Live RTP data**

- **Trend data and longer term data**

- **Win32 Executable & Service**

- **RPM installable & Service**

- **Alarm/Notification features**

- **More comprehensive diagnostic output**

- **Node Service**
  – Beacon side done already

- **AG-specific feature:**
  - A Beacon process to join a Venue group and forward local RTCP reports to Venue server for display there

- **Open source / Sourceforge model**

  - Someone is doing Gnuplot via PNG for stats

- **Listserv – beacon@dast.nlanr.net**

  - See dast.nlanr.net/projects/beacon to subscribe

Questions?

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